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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/944,186	09/04/2001	Atsushi Yamaguchi	PF-2871	1202

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EXAMINER
HU, SHOUXIANG

ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 03/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/944,186	Applicant(s) YAMAGUCHI ET AL.	
	Examiner Shouxiang Hu	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 January 2002* .

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-120* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) *1-120* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

This application contains claims 1-120 directed to the following patentably distinct species of the claimed invention:

Species 1 (claims 1-10), a semiconductor device, wherein a threshold mode gain of each of the at least quantum well is not more than 12 cm^{-1}, and wherein a standard deviation of a microscopic fluctuation in a band gap energy of said at least luminescent layer is in the range of 75 meV to 200 meV.

Species 2 (claims 11-20), a semiconductor device, wherein a threshold mode gain of each of said at least quantum well is not more than 12 cm^{-1}, and wherein a differential gain "dg/dn" of the at least active layer satisfies $0.5x10^{-20}(m^2) \leq dg/dn \leq 0.7 x10^{-20}(m^2)$.

Species 3 (claims 21-30), a semiconductor device, wherein an internal loss "α_i" (cm^{-1}) which satisfies: $\alpha_i \leq 12xn - \alpha_m (cm^{-1})$, where α_m is a mirror loss, and "n" is a number of said at least quantum well, and wherein a standard deviation of a microscopic fluctuation in a band gap energy of said at least luminescent layer is in the range of 75 meV to 200 meV.

Species 4 (claims 31-40), a semiconductor device, wherein an internal loss "α_i" (cm^{-1}) which satisfies: $\alpha_i \leq 12xn - \alpha_m (cm^{-1})$, where α_m is a mirror loss, and "n" is a number of said at least quantum well, and wherein a differential gain "dg/dn" of said at least active layer satisfies $0.5x10^{-20}(m^2) \leq dg/dn \leq 0.7 x10^{-20}(m^2)$.

Species 5 (claims 41-50), a semiconductor device, wherein a slope efficiency "S" (W/A) which satisfies: $S \geq 3x \{\alpha_m/(12xn)\} x [\{(1-R_1) x \text{ squareroot } (R_2)\} / \{(1- \text{ squareroot } (R_1R_2) x (\text{squareroot } (R_1) + \text{squareroot } (R_2)\}]$, where R_1 is a first reflectance of a first cavity facet, from which a light is emitted, R_2 is a second reflectance of a second cavity facet opposite to the first cavity facet, α_m is a mirror loss, and "n" is a number of the at least quantum well, and wherein a standard deviation of a microscopic fluctuation in a band gap energy of said at least luminescent layer is in the range of 75 meV to 200 meV.

Species 6 (claims 51-60), a semiconductor device, wherein a slope efficiency "S" (W/A) which satisfies: $S \geq 3x \{\alpha_m/(12xn)\} x [\{(1-R_1) x \text{ squareroot } (R_2)\} / \{(1- \text{ squareroot } (R_1R_2) x (\text{squareroot } (R_1) + \text{squareroot } (R_2)\}]$, where R_1 is a first reflectance of a first cavity facet, from which a light is emitted, R_2 is a second reflectance of a second cavity facet opposite to the first cavity facet, α_m is a mirror loss, and "n" is a number of the at least quantum well, and wherein a differential gain "dg/dn" of the at least active layer satisfies $0.5x10^{-20} (m^2) \leq dg/dn \leq 0.7 x10^{-20} (m^2)$.

Species 7 (claims 61-70), a semiconductor device, wherein a threshold mode gain of each of said at least quantum well is more than 12 cm^{-1}, and wherein a standard deviation of a microscopic fluctuation in a band gap energy of said at least luminescent layer is not more than of 40 meV.

Species 8 (claims 71-80), a semiconductor device, wherein a threshold mode gain of each of said at least quantum well is more than 12 cm^{-1}, and wherein a differential gain "dg/dn" of said at least active layer satisfies $dg/dn \geq 1.0 \times 10^{-20} (m^2)$.

Species 9 (claims 81-90), a semiconductor device, wherein an internal loss "α_i" (cm^{-1}) which satisfies: $\alpha_i > 12xn - \alpha_m$ (cm^{-1}), where α_m is a mirror loss, and "n" is a number of said at least quantum well, and wherein a standard deviation of a microscopic fluctuation in a band gap energy of said at least luminescent layer is not more than of 40 meV.

Species 10 (claims 91-100), a semiconductor device, wherein an internal loss "α_i" (cm^{-1}) which satisfies: $\alpha_i > 12xn - \alpha_m$ (cm^{-1}), where α_m is a mirror loss, and "n" is a number of said at least quantum well, and wherein a standard deviation of a microscopic fluctuation in a band gap energy of said at least luminescent layer is not more than of 40 meV, and wherein a differential gain "dg/dn" of said at least active layer satisfies $dg/dn \geq 1.0 \times 10^{-20}$ (m^2).

Species 11 (claims 101-120), a semiconductor device, wherein a slope efficiency "S" (W/A) which satisfies: $S < 3x \{\alpha_m/(12xn)\} \times [\{(1-R_1) \times \text{squareroot}(R_2)\} / \{(1-\text{squareroot}(R_1R_2) \times (\text{squareroot}(R_1) + \text{squareroot}(R_2)\}]$, where R_1 is a first reflectance of a first cavity facet, from which a light is emitted, R_2 is a second reflectance of a second cavity facet opposite to the first cavity facet, α_m is a mirror loss, and "n" is a number of the at least quantum well, and wherein a standard deviation of a microscopic fluctuation in a band gap energy of said at least luminescent layer is not more than of 40 meV.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, none is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim

remaining in the application. Any amendment of inventorship must be accompanied by a petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(l).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is (703) 306-5729. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SH
March 4, 2003

Shouxiang Hu
Patent Examiner
TC2800